

IN THE CLAIMS

This listing of the claims will replace all prior versions, and listing, of claims in the application or previous response to office action:

1. (Currently Amended) A composite piezoelectric ultrasonic transducer, comprising:

 a ribbon-wound piezoelectric element having a winding of a piezoelectric film ribbon wound against an electrically insulating elastomer material;

 wherein the piezoelectric film ribbon has three layers: two outer conductive layers and an inner piezoelectric polymer film-layer;

wherein the elastomer material is a material having a lower modulus of elasticity than that of the polymer layer, and forms an elastic layer between the conductive layers as the film ribbon is wound, and wherein a material property of the elastomer is such that the velocity of an acoustic wave through the elastic layer is substantially lower than through the film ribbon;

wherein the winding has a disk shape with a substantially circular top surface and bottom surface;

wherein the winding has a width selected such that the resonant frequency is an ultrasonic frequency, said width being calculated substantially as an average of the velocity of sound through the film ribbon and the elastomer material divided by four times the ultrasonic frequency;

 a face plate covering the top surface or bottom surface of the winding, the face plate operable to couple for low impedance matching of ultrasonic wave detection or generation acoustic activity between the winding piezoelectric element and the environment external to the transducer; and

a rigid backing on the surface of the winding opposing the face plate, operable to confine radiation and detection of ultrasonic waves to the face plate; and
 a pair of electrically conductive leads, one to each conductive layer.

2. (Original) The transducer of Claim 1, wherein the conductive layers are a metalized film.

3. (Original) The transducer of Claim 1, wherein the inner piezoelectric polymer film layer is made from a polyvinylidene diflouride material.

4. - 10. (Cancelled)

11. The transducer of Claim 1, further comprising a metal housing for enclosing all elements except the surface of the face plate.

12. The transducer of Claim 1, wherein the velocity of ultrasonic waves through the elastomer material is equal to or less than one half the velocity of ultrasonic waves through the film ribbon.

13. The transducer of Claim 1, wherein the backing is made from a ceramic material.